

This Page Is Inserted by IFW Operations
and is not a part of the Official Record

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

**As rescanning documents *will not* correct images,
please do not report the images to the
Image Problem Mailbox.**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:)
MATSUNAGA, et al.)
Serial No: 09/733,228)
Filed: December 8, 2000)
For: PROBE PIN FOR TESTING)
ELECTRICAL CHARACTERISTICS OF)
APPARATUS, PROBE CARD USING PROBE)
PINS, AND METHOD FOR FABRICATING)
THE PROBE PIN (As Amended))
_____)

Art Unit: 2829
Examiner: J. NGUYEN

I hereby certify that this correspondence is
being deposited with the United States Postal
Service with sufficient postage as first class
mail in an envelope addressed to:
Assistant Commissioner for Patents
Washington D.C. 20231, on

May 20, 2002
Date of Deposit

Mark R. Kendrick
Name

Mark R. Kendrick 05/20/2002
Signature Date

AMENDMENT

Assistant Commissioner for Patents
Washington, D.C. 20231

Dear Sir:

In response to the Office Action dated February 19, 2002, in connection with the
above-identified application, the date for response being May 20, 2002, the first
business day after Sunday, May 19, 2002, please enter and consider the following
amendment and remarks.

IN THE TITLE

The Title has been amended, at page 1, lines 1 - 3, as follows:

PROBE PIN FOR TESTING ELECTRICAL CHARACTERISTICS OF
APPARATUS, PROBE CARD USING PROBE PINS.

IN THE SPECIFICATION

The Specification has been amended, at page 10, line 31 – page 11, line 1 as follows:

The second face (i.e., the bottom faces) of the probe pins are connected to the electrodes 291 – 293 by an adhesive layer 305 in place of, or together with solder balls 281, 282, 283.

IN THE CLAIMS:

Claims 1 – 3, 6 – 7, and 9 – 16 have been amended; claims 17 – 23 have been cancelled; and new claims 24 - 27 have been added as follows:

1. (Amended) A probe pin for testing electric characteristics of an apparatus, comprising:
 - a cylindrical elongated silicon pin core; and
 - a conductive layer covering completely all of a surface of the cylindrical elongated silicon pin core.
2. (Amended) A probe pin for testing electric characteristics of an apparatus, comprising:
 - a cylindrical elongated silicon pin core having a tip, a side, and a bottom; and
 - a conductive layer covering the tip, the side, and the bottom of the cylindrical elongated silicon pin core.
3. (Amended) A probe pin for testing electric characteristics of an apparatus, comprising:
 - a silicon pin core having a tip, a side, and a bottom; and
 - a conductive layer covering the tip, the side, and the bottom of the silicon pin

core, wherein the silicon pin core has a metal silicide film at the bottom.

6. (Amended) A probe assembly comprising:

a probe pin for testing electric characteristics of an apparatus, the probe pin comprising a cylindrical elongated silicon pin core and a conductive layer covering completely all of a surface of the cylindrical elongated silicon pin core, the probe pin having a tip and a bottom; and

an electrode connected to the bottom of the probe pin.

7. (Amended) A probe assembly, comprising:

a probe pin for testing electrical characteristics of an apparatus, the probe pin comprising a silicon pin core and a conductive layer covering an entire surface of the silicon pin core, the probe pin having a tip and a bottom; and

an electrode positioned below and connected to the bottom of the probe pin, wherein the silicon pin core of the probe pin has a metal silicide film at a bottom thereof.

9. (Amended) The probe assembly according to claim 7, wherein the electrode is connected to the bottom of the probe pin by solder.

10. (Amended) The probe assembly according to claim 7, wherein the electrode is connected to the bottom of the probe pin using a bonding agent or a resin.

11. (Amended) A probe card comprising:

a probe pin for testing electric characteristic of an apparatus, the probe pin comprising a cylindrical elongated silicon pin core and a conductive layer covering completely all of a surface of the cylindrical elongated silicon pin core, the probe pin having a tip and a bottom; and

a print wiring board having an electrode, the electrode connected to the bottom of the probe pin.

12. (Amended) A probe card, comprising:

one or more probe pins for testing electric characteristics of an apparatus, each probe pin comprising a silicon pin core and a conductive layer covering an entire surface of the silicon pin core, each probe pin having a tip and a bottom; and

a print wiring board having one or more electrodes, each electrode positioned below and connected to the bottom of a corresponding probe pin, wherein the silicon pin core has a metal silicide at a bottom thereof.

13. (Amended) The probe card according to claim 12, wherein at least one of the electrodes is connected to the bottom of the corresponding probe pin by solder.

14. (Amended) The probe card according to claim 12, wherein at least one of the electrodes is connected to the bottom of the corresponding probe pin using a bonding agent or resin.

15. (Amended) The probe card according to claim 12, further comprising an insulating layer that surrounds and supports at least one of the probe pins with the tip of at least one of the probe pins projecting from a top surface of the insulating layer.

16. (Amended) The probe card according to claim 12, wherein the print wiring board has at least one interconnection connected to the bottom of at least one of the electrodes and extending inside the writing board.

New claims 24 - 27 have been added as follows:

24. (New) The probe pin according to claim 3, wherein the conductive layer comprises a gold layer.

25. (New) The probe assembly according to claim 7, wherein the conductive layer comprises a gold layer.
26. (New) The probe card according to claim 12, wherein the conductive layer comprises a gold layer.
27. (New) The probe card according to claim 16, wherein the print wiring board further comprises at least one second electrode formed on a lower surface of the probe card, wherein the at least one interconnection connects at least one of the electrodes and at least one of the second electrodes.

REMARKS

Claims 1 – 16 and 24 - 27 are pending. Claims 17 – 23 have been cancelled. Claims 1 – 3, 6 – 7, and 9 - 16 are amended. New claims 24 - 27 have been added. No new matter has been introduced. Reexamination and reconsideration of the application are respectfully requested.

In the February 19, 2002 Office Action, the Examiner rejected claims 1, 2, 6, 9 – 11, and 13 - 16. The Examiner objected to claims 3 – 5, 7, 8, and 12. The Examiner withdrew claims 17 – 23 from consideration. The Examiner rejected claim 1 under 35 U.S.C. 112, second paragraph, as being indefinite. The Examiner rejected claim 1 under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,175,242 to Akram et al. (the Akram reference). The Examiner rejected claims 1 and 2 under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,677,978 to Lewis et al. (the Lewis reference). The Examiner rejected claims 6, 9, 10, 11, 13 – 16 under 35 U.S.C. 103(a) as being obvious over the Lewis reference, in view of U.S. Patent No. 6,329,827 to Beaman et al. (the Beaman reference). Finally, the Examiner objected to claims 3- 5, 7, 8, and 12 as being dependent upon a rejected base claim, but indicated that the claims would be allowable if rewritten in independent form including all of the limitations and any intervening claims.

Applicants affirm the election, without traverse, to prosecute Group I claims, claims 1 – 16. Claims 17 – 23 have been cancelled.

Applicants have amended the specification at page 10, line 31 to page 11, line 1 to overcome the objection to the drawings.

The present invention relates to a probe pin for testing the electrical